



# North Carolina State Primer



**A Primer on  
Developing  
North Carolina's  
Landfill Gas  
Utilization  
Potential**



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# Contents

## Introduction

1.	The Goals of This Primer	.iii
2.	LFG Projects in North Carolina	.iv
3.	About the Landfill Methane Outreach Program	.v
4.	Where to Go for More Information	.x

## Part 1: Standards and Permits

1.	Overview of Federal Regulations and Permits	.1
1.1	Clean Air Act (CAA)	.1
1.2	Resource Conservation and Recovery Act Subtitle D	.4
1.3	National Pollutant Discharge Elimination System Permit (NPDES)	.4
1.4	Clean Water Act, Section 401	.5
1.5	Other Federal Permit Programs	.5
2.	State Regulations and Permits	.6
3.	Overview of Local Regulations and Permits	.9

## Part 2: Incentive Programs

1.	Overview of Federal Incentive Programs	.11
1.1	Renewable Energy Production Incentive (REPI)	.11
1.2	Qualifying Facilities Certification	.11
1.3	Section 29 Tax Credit	.12
2.	State Incentive Programs	.12
3.	Electricity Restructuring and LFG	.12
4.	Voluntary Reporting of Greenhouse Gases Program	.13

## Tables

Table A	Candidate Landfills for LFG Projects in North Carolina	.vi
Table B	Small Candidate Landfills in North Carolina	.viii
Table 2.1	Summary Table of State Regulations/Permits	.7
Table 2.2	Solid Waste Permits Summary and Checklist	.7
Table 2.3	State Air Program Requirements and Checklist	.8
Table 3.1	Local Regulations and Permits	.10

## Appendix A

State Contacts	.20
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# Introduction

## 1. The Goals of This Primer

Throughout the country, the number of landfill gas (LFG) utilization projects is growing. Recovering methane gas at solid waste landfills provides significant environmental and economic benefits by eliminating methane emissions while capturing the emissions' energy value. Methane captured from landfills can be transformed into a cost-effective fuel source for generating electricity and heat, firing boilers or even powering vehicles.

Permits, incentive programs and policies for LFG project development vary greatly from state to state. The U.S. Environmental Protection Agency's (EPA's) Landfill Methane Outreach Program (LMOP) has worked with state agencies to develop individual primers for states participating in the State Ally Program. The primers can be used to guide LFG project developers through the state permitting process and to help them to take advantage of state incentive programs. This primer provides information on federal and state regulations and incentives affecting LFG projects. LMOP and North Carolina state officials hope to facilitate development of many of the landfills listed in Table A.

To develop this primer, the state of North Carolina identified all the permits and funding programs that could apply to LFG projects developed in North Carolina. It should be noted, however, that the regulations, agencies and policies described are subject to change. Changes are likely to occur whenever a state legislature meets or when the federal government proposes new directions for state and local governments. LFG project developers should verify and continuously monitor the status of laws and rules that might affect their plans or the operations of their projects.

### ***Who Should Read This Primer?***

This primer is designed to help facilitate landfill gas recovery in the state of North Carolina. It provides information for developers of LFG projects, as well as all other participants in such projects.

- Landfill operators
- Utility companies
- Independent power producers
- Utility regulators
- State regulators
- Engineers
- Equipment vendors
- Community officials
- Landfill owners

### ***What Information Does This Primer Contain?***

If you are interested in taking advantage of the economic and environmental opportunities in LFG recovery in North Carolina, you will need to know the regulatory requirements that apply. You will also need to know the economic incentives available to help make these projects more economically viable.

To address these needs, this primer covers the following topics:

- Federal Regulations and Permits. This section provides information on federal regulations that may pertain to LFG projects, including solid waste, air quality and water quality regulations.
- State Regulations and Permits. This section provides information on state permits that apply to landfill gas recovery projects in North Carolina.

- Local Regulations and Permits. Local permit approval will often be needed for LFG projects. This section offers a step-by-step process you can follow to secure this approval.
- Federal Incentive Programs. This section presents information on federal incentives that may apply to LFG projects.
- State Incentive Programs. This section presents information about environmental infrastructure financing opportunities in the state of North Carolina.
- Electricity Restructuring. This section discusses how renewable energy provisions in state electricity restructuring regulations might apply to LFG projects.

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## **2. LFG Projects in North Carolina**

North Carolina is a member of the LMOP State Ally Program, which encourages cooperation between EPA and state energy and environmental agencies to promote the development of LFG resources. As a state ally, the North Carolina Department of Environment and Natural Resources works to develop consensus among landfill operators, utility companies, independent power producers, project developers, utility regulators, and state regulators to promote new energy and environmental opportunities from which all North Carolina residents will benefit.

Fifteen LFG projects are currently operating in North Carolina and several more are under consideration. With the closure of unlined landfills located in almost every county, North Carolina has a number of landfills with the potential to support economically viable LFG utilization projects. In addition, North Carolina has approximately 42 operating lined (Subtitle D) landfills that can be characterized as “large” facilities. As such, they should offer opportunities for landfill gas utilization on a larger scale.

Table A (page vi) lists operating landfills and those that were recently closed. All municipal solid waste landfills operating in North Carolina after January 1, 1998 are required to be lined. These are considered candidate landfills by EPA because they meet certain size and age requirements. Most of the permitted, lined landfills in North Carolina will be subject to the New Source Performance Standards requirements. Several are in the process of installing the requisite controls. All landfills that closed in 1998 have passive vents as part of the closure. The notation of “Flare” indicates that an active collection system is installed. Facilities owned by private industry are so identified.

North Carolina is a national pioneer in developing landfill gas utilization projects for small (<1 million tons of waste) landfills. At the small Yancey/Mitchell County landfill a unique partnership of public, private, nonprofit, economic and educational consortiums worked together to implement a unique plan. A second project at Avery County has secured funding and the gas collection system will be installed in the fall of 2000.

Working with the local junior college and high school, the Yancy/Mitchell County project is raising native ornamental plants, such as wild azaleas and rhododendrons for sale to local nursery growers and reforestation projects. The greenhouses are warmed via hotwater radiators. The water is heated in a low-pressure boiler fired with the landfill gas. In conjunction with “Hands-Across-America,” the region’s fine potters and glass blowers are being provided incubator gallery space, access to landfill gas-fired glass blowing equipment and ceramic kilns. Unique educational opportunities are available to the region’s school children, with emphasis on sustainable development, recycling and alternative energy supplies.

Other forward-thinking counties have formed working groups and are evaluating a diverse and creative universe of possibilities for using their small landfill gas. Projects under consideration include additional greenhouses, using the gas to fire a “burnhouse” for training firefighters, and using the gas to power refrigeration equipment for cold storage of apples and other crops.

North Carolina is committed to finding uses for as much landfill gas as possible. For more information, contact the State LMOP coordinator (page x).

Table B contains a list of small landfills in North Carolina. EPA considers small landfills to have less than 1 million tons of waste in place. Landfills that closed after April 1994 have passive vents installed as a condition of closure. The landfills are located in counties that are predominantly rural and many are considered economically depressed, underemployed or otherwise candidates for possible economic incentive funding.

Information on North Carolina facilities is available via the internet. The URL is: <http://wastenot.enr.state.nc.us/swhome>. This site lists the operational status, location, contact name and other information on North Carolina landfills. The same site also has a comprehensive database on the amount and type of waste disposed of in the state. The tonnages of materials disposed of, by type, and recycled are reported on an annual basis. Data are available from fiscal year 1992–1993 to the present.

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### **3. About the Landfill Methane Outreach Program**

To promote the use of landfill gas as an energy source, EPA has established the Landfill Methane Outreach Program (LMOP). The goals of LMOP are to reduce methane emissions from landfills by:

- Encouraging environmentally and economically beneficial LFG project development, and
- Removing barriers to developing LFG projects.

To achieve these goals, EPA establishes alliances with these four key constituencies.

- State environmental and energy agencies
- Energy users/providers (including investor-owned, municipal and other public power utilities, cooperatives, direct end users and power marketers)
- Industry (including developers, engineers and equipment vendors)
- Community partners (municipal and small private landfill owners and operators; cities, counties and other local governments and community groups)

EPA establishes these alliances through a Memorandum of Understanding (MOU). By signing the MOU, each ally and partner acknowledges a shared commitment to promoting landfill gas energy recovery at solid waste landfills. The alliance members also recognize that the widespread use of landfill gas as an energy resource will reduce methane and other air emissions, and commit to certain activities that enhance the development of this resource.

As of September 2000, more than 320 landfill methane recovery projects were operating in the United States. EPA estimates that up to 650 landfills across the United States could install economically viable landfill gas projects.

**Table A****Candidate Landfills for LFG Projects in North Carolina**

<b>Facility</b>	<b>Permit</b>	<b>Lined</b>	<b>Status</b>	<b>Notes</b>
Alamance	0101	No	Closed	
Alamance	0104	Yes		
Ashe	0501	Yes		
Avery	0601	No	Closed 10/93	
E. Carolina Regional (Bertie)	0803	Yes	Republic Industries	
Brunswick	1007	No	Closed 1/98	
Cabarrus	1302	No	Closed 1/98	
Caldwell	1401	No	Closed 1/98	
Caldwell	1403	Yes	Republic Industries	
Cherokee	2002	Yes		
Cleveland	2301	No	Closed 1/98	
Cleveland	2301	Yes		
Columbus	2401	No	Closed 1/98	
Craven	2503	No	Closed 10/93	
Crswma-Irlc (Craven)	2504	Yes	Closed 8/99	
Crswma-Irlc (Craven)	2509	Yes		
Fort Bragg (Cumberland)	2602	No	Closed 1/98	
Durham City	3201	No	Closed 1/98	Flare
Edgecombe	3301	No	Closed 1/98	
Piedmont Regional (Forsyth)	3406	Yes	Waste Mngt Inc.	Flare
Gaston	3606	Yes		Vents
Highpoint-Kersey Valley (Guilford)	4104	Yes		
Harnett-Dunnerwin	4302	No	Closed 1/98	
Harnett-City	4303	No	Closed 4/94	
Haywood	4407	Yes		
Johnston	5101	No	Closed 1/98	Vents
Johnston	5102	Yes		
Lee	5301	No	Closed 10/93	
Lenior	5403	No	Closed 1/98	
Lincoln	5503	Yes		
Macon	5703	Yes		
Madison	5803	Yes		
Mecklenburg	6001	No	Closed 10/93	



<b>Facility</b>	<b>Permit</b>	<b>Lined</b>	<b>Status</b>	<b>Notes</b>
Mecklenberg	6019	Yes		
Montgomery	6201	No	Closed 1/98	Flare
Uwharrie Regional (Montgomery)	6204	Yes	Republic Industries	
Nash	6401	No	Closed 1/98	
New Hanover	6504	Yes		
Camp Lejeune (Onslow)	6703	No	Closed 1/98	
Camp Lejeune (Onslow)	6708	Yes		
Onslow	6709	Yes		
Orange	6801	Yes		
Upper Piedmont Env. (Person)	7304	Yes	Republic Industries	
Randolph	7601	No	Closed 1/98	
Robeson	7803	No	Closed 1/98	
Robeson	7803	Yes		
Rockingham	7901	Yes		
Rowan	8003	Yes		
Sampson	8201	Yes	Waste Industries	Flare
Sampson	8202	Yes	Waste Industries	
Albemarle-City (Stanly)	8401	Yes		
Stokes	8501	No	Closed 4/94	
Surry-Airy	8602	No	Closed 1/98	
Surry	8606	Yes		
Transylvania	8807	Yes		
Wake-South	9203	No	Closed 1/98	
Watauga	9502	No	Closed 4/94	Flare
Wayne	9601	No	Closed 1/98	
Wayne	9606	Yes		
Wilkes	9704	Yes		
Wilson	9801	No	Closed 1/98	

**Table B****Small Candidate Landfills in North Carolina**

<b>Facility</b>	<b>Permit</b>	<b>Lined</b>	<b>Status</b>
Alexander	0201	No	Closed 1/98
Alleghany	0302	No	Closed 4/94
Anson	0401	No	Closed 4/94
Beaufort	0702	No	Closed 10/93
Bertie	0801	No	Closed 10/93
Bladen	0901	No	Closed 4/94
Burke	1203	No	Closed 1/98
Carteret	1602	No	Closed 10/93
Caswell	1701	No	Closed 4/94
Chatham	1901	No	Closed 10/93
Cherokee	2001	No	Closed 1/98
Clay	2201	No	Closed 4/94
Currituck	2701	No	Closed 4/94
Dare	2802	No	Closed 10/93
Davie	3001	No	Closed 4/94
Duplin	3101	No	Closed 10/93
Franklin	3501	No	Closed 4/94
Graham	3801	No	Closed 4/94
Granville-Oxford	3901	No	Closed 1/98
Granville-Butner	3902	No	Closed 1/98
Greene	4002	No	Closed 1/98
Halifax	4204	No	Closed 1/98
Canton City (Haywood)	4404	No	Closed 4/94
Hertford	4601	No	Closed 4/94
Hoke	4701	No	Closed 4/94
Western Carolina Univ.	5001	No	Closed 10/93
Jackson	5002	No	Closed 1/98
Jones	5201	No	Closed 4/94
McDowell	5601	No	Closed 4/94
Martin	5901	No	Closed 4/94
Moore	6301	No	Closed 10/93

<b>Facility</b>	<b>Permit</b>	<b>Lined</b>	<b>Status</b>
Northhampton	6601	No	Closed 10/93
Onslow	6705	No	Closed 1/98
Pamlico	6902	No	Closed 10/93
Pasquotank	7002	No	Closed 4/94
Pender	7101	No	Closed 4/94
Perquimans	7201	No	Closed 4/94
Person	7301	No	Closed 4/94
Polk	7502	No	Closed 4/94
Richmond	7702	No	Closed 10/93
Rutherford	8103	No	Closed 1/98
Scotland	8301	No	Closed 1/98
Surry-Elkin	8603	No	Closed 1/98
Swain	8701	No	Closed 4/94
Union	9001	No	Closed 1/98
Vance	9101	No	Closed 1/98
Warren	9301	No	Closed 4/94
Washington	9402	No	Closed 4/94
Watauga	9502	No	Closed 4/94
Yadkin	9902	No	Closed 4/94

## **4. Where To Go For More Information**

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***In the Western half of the state, contact:***

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**Department of Commerce**

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***EPA's LMOP program:***

U.S. Environmental Protection Agency  
Landfill Methane Outreach Program (6202J)  
1200 Pennsylvania Avenue, N.W.  
Washington DC 20460  
(888) STAR-YES (782-7937)  
Fax (202) 565-2077  
<http://www.epa.gov/lmop>

# Part 1: Regulations and Permits

## 1. Overview Of Federal Regulations And Permits

The following section discusses federal regulations that may pertain to LFG projects. LFG projects can be subject to solid waste, air quality and water quality regulations. The federal regulations are presented in general terms, because individual state/local governments generally develop their own regulations for carrying out the specific requirements. Project developers will have to contact relevant federal agencies and, in some cases, state agencies for more detailed information and applications. The discussion of each key federal regulation/permit contains three components.

- Importance of the regulation/permit to LFG project developers
- Applicability to LFG projects
- Description of each regulation/permit

### 1.1 Clean Air Act (CAA)

The CAA regulates emissions of pollutants to protect public health and the environment. The CAA contains three provisions that may affect LFG projects. The first two provisions, the New Source Performance Standards (NSPS)/Emission Guidelines (EG) and New Source Review (NSR) are currently in effect. The third provision, the Maximum Achievable Control Technology (MACT) standard, was recently proposed and may be finalized in late 2001.

Facilities planning to construct a new LFG system or those planning to modify a landfill operation to incorporate a LFG system must obtain a Construction and Operating Permit from the responsible air regulatory agency if emissions from the project exceed the major facility emission thresholds. The Construction and Operating Permit specifies the NSPS/EG and NSR requirements that the project must meet. The general requirements of the NSPS/EG, NSR, and Title V for LFG projects are discussed below.

#### ***New Source Performance Standards (NSPS) and Emissions Guidelines for MSW Landfills***

- Importance** LFG projects can be part of a compliance strategy to meet EPA's emissions standards for landfill gas.
- Applicability** Landfills meeting certain design capacity, age and emissions criteria are required to collect LFG. Numerous control options to combust LFG are provided to landfill owner/operators including but not limited to LFG projects.
- Description** EPA final regulations under the CAA amendments require affected landfills to collect and control LFG. Specifically, landfills that are 2.5 million megagrams and 2.5 million cubic meters in size and have estimated emissions of nonmethane organic compounds (NMOC) of at least 50 megagrams per year must reduce their emissions of landfill gas. The regulations identify NMOC as a surrogate for landfill gas. Therefore, the emission reductions required in the rules are specified as reductions of NMOC.
- Landfill gas emissions were targeted in these rules because of the potential negative impact on human health and the environment from the volatile organic compounds contained in the gas.

In addition, the contribution of landfill gas to local smog formation, local odors, and potential explosives were included in the decision-making process. Finally, the potential for landfill fires was also factored into the decision.

For landfills that received waste after November 8, 1987 (“existing landfills”), the Emission Guidelines (40 CFR Part 60 Subpart Cc) apply. For landfills that commenced construction, reconstruction, or modification on or after May 30, 1991 (“new landfills”) the New Source Performance Standards (40 CFR Part 60 Subpart WWW) apply. The collection and control requirements in each of these standards is the same; only the start of the compliance clock differs.

The final regulations can be found in the Federal Register, March 12, 1996, Vol. 61, No. 49, pages 9257-9262.

The basic requirements are the same for both existing and new landfills. Landfills that meet both of the following criteria must comply with the regulations.

- Capacity—maximum design capacity greater than or equal to 2.5 million Mg<sup>1</sup> (and 2.5 million cubic meters, about 2.75 million tons). If NMOC emissions are less than 50 Mg for a facility greater than 2.5 million Mg and 2,5 million cubic meters, reporting is required. If the annual emissions are 50 Mg or more for these landfills, collection and control of landfill gas are required.
- Emissions—annual NMOC emission rate is greater than 50 Mg (about 55 tons).

### ***Air Emissions: New Source Review (NSR) Permitting Process***

**Importance** New LFG projects may be required to obtain construction permits under New Source Review (NSR). Depending on the area in which the project is located, obtaining these permits may be the most critical aspect of project approval.

**Applicability** The combustion of LFG results in emissions of carbon monoxide, oxides of nitrogen and PM-10. Requirements vary for control of these emissions depending on local air quality. The relevant standards for a particular area will be discussed in Section 2, State Standards and Permits. Applicability of these standards to LFG projects will depend on the level of emissions resulting from the technology used in the project and the project's location (i.e., attainment or nonattainment area).

**Description** CAA regulations require new stationary sources and modifications to existing sources of certain air emissions to undergo NSR before they can operate. The purpose of these regulations is to ensure that sources meet the applicable air quality standards for the area in which they are located. Because these regulations are complex, a landfill owner or operator or the owner/operator of the LFG project may want to consult an attorney or expert familiar with NSR for more information about permit requirements in a particular area.

The existing CAA regulations for attainment and maintenance of ambient air quality standards regulate six criteria pollutants—ozone, nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), particulate matter (PM-10), sulfur dioxide (SO<sub>2</sub>), and lead. The CAA authorizes the EPA to set both health and public welfare-based national ambient air quality standards (NAAQS) for each criteria pollutant. Areas that meet the NAAQS for a particular air pollutant are classified as being in “attainment” for that pollutant and those that do not are in “nonattainment.” Because each state is required to develop an air quality implementation plan (called a State Implementation Plan or SIP) to attain and maintain compliance with the NAAQS in each Air Quality Control Region within the state, specific permit requirements will vary by state. However, the minimum requirements of the federal permitting regulations must still be met. (See 40 CFR 51.160-51.166 for more information.)

<sup>1</sup>Landfills with less than 2.5 million Mg are required to file a design capacity report.

The location of the LFG project will dictate what kind of construction and operating permits are required. If the LFG project is located in an area that is in attainment for a particular pollutant, the LFG project must undergo Prevention of Significant Deterioration permitting for that pollutant (and possibly others). Nonattainment Area permitting is required for those LFG projects that are located in areas that do not meet the NAAQS for a particular air pollutant. Furthermore, the level of emissions from the project determines whether the project must undergo major NSR or minor NSR. The requirements of major NSR permitting are greater than those for minor NSR. The following provides more detail on new source permits.

## **Prevention of Significant Deterioration Permitting**

Prevention of Significant Deterioration (PSD) review is used in attainment areas to determine whether a new or modified emissions source will cause significant deterioration of local air quality. The State air office can assist LFG project developers in determining whether a proposed project requires PSD approval.

All areas are governed to some extent by PSD regulations, because no location is in nonattainment for all criteria pollutants. At this time, applicants must determine PSD applicability for each individual pollutant based on its attainment/nonattainment status. For gas-fired sources, PSD major NSR is required if the new source will emit or has the potential to emit any criteria pollutant at a level greater than 250 tons per year (unless it is a listed source category).

If the source is considered major, the PSD major NSR permit process is required for the major pollutant (except for a nonattainment pollutant) and any other pollutant emitted in significant amounts. This process requires in part that applicants determine the maximum degree of reduction achievable through the application of available control strategies. Major sources generally must undergo the following PSD steps:

- Best Available Control Technology (BACT) analysis
- Monitoring of local air quality
- Source impact analysis/modeling
- Additional impact analysis/modeling (i.e., impact on vegetation, visibility and Class I areas)<sup>2</sup>

Minor sources (i.e., below 100/250 tons per year) are exempt from this process, but these sources may still be required to obtain a construction and operating air permit. See 40 CFR 52.21 for more information on PSD.

## **Nonattainment Air Permitting**

A source locating in an area that has been designated nonattainment for one or more of the six criteria pollutants may be subject to the nonattainment NSR for such pollutants. Ozone is the most pervasive nonattainment pollutant, and the one most likely to affect LFG projects. A proposed new emissions source, or modification of an existing source located in a nonattainment area, must undergo nonattainment major NSR if the new source, or the modification is classified as major (i.e., if the new or modified source exceeds specified emissions thresholds, typically 100 tons per year, but lower in some cases for VOC/NO<sub>x</sub> and PM-10). To obtain a nonattainment NSR permit for criteria pollutants, a project must meet several requirements:

- Use technology that achieves the Lowest Achievable Emissions Rate (LAER) for the nonattainment pollutant
- Arrange for an actual emissions reduction at an existing combustion source that offsets the emissions from the new project at specific ratios

<sup>2</sup>Class I areas are specific under the Clean Air Act and include national parks. Projects situated within a certain distance from Class I areas are subject to more stringent criteria for emissions levels.

## ***Title V Operating Permit***

<b>Importance</b>	LFG projects will likely be part of a source that is required to obtain an operating permit under title V of the CAA. Regulations implementing this title can be found at 40 CFR parts 70 and 71.
<b>Applicability</b>	A source becomes subject to title V permitting as a result of triggering one or more of the applicability criteria found in 40 CFR 70.3 or 71.3. For example, if a source is a major source under section 112, section 302, or part D of title I, then the source is required to obtain a title V permit. The 12-month deadline for submitting a timely and complete title V application is triggered by the criterion in 40 CFR 70.3 or 71.3 which first causes a source to become subject to title V.
<b>Description</b>	Title V permits incorporate the requirements of the CAA which apply to a source and clarify how these requirements apply. In the process of applying for a title V permit, many sources have discovered that they are out of compliance with various applicable requirements. The regulations at 40 CFR parts 70 and 71 require sources to self-certify compliance with applicable requirements initially and annually and provide an opportunity for the public to comment on whether a source is complying with its applicable requirements. A permit requires a source to promptly report deviations from the permit and helps ensure ongoing emissions reductions at the source.

## **1.2 Resource Conservation and Recovery Act Subtitle D**

<b>Importance</b>	Before a LFG project can be developed, all Resource Conservation and Recovery Act (RCRA) Subtitle D requirements (i.e., requirements for non-hazardous waste management) must be satisfied.
<b>Applicability</b>	Methane is explosive in certain concentrations and poses a hazard if it migrates beyond the landfill facility boundary. Landfill gas collection systems must meet RCRA Subtitle D standards for gas control.
<b>Description</b>	In October 1979, federal regulations were promulgated under Subtitle D of RCRA, requiring controls on migration of landfill gas. In 1991, EPA promulgated landfill design and performance standards; the newer standards apply to municipal solid waste landfills that were active on or after October 9, 1993. Specifically, the standards require monitoring of LFG and establish performance standards for combustible gas migration control. Monitoring requirements must be met at landfills not only during their operation, but also for a period of 30 years after closure.

Landfills affected by RCRA Subtitle D are required to control gas by establishing a program to periodically check for methane emissions and prevent offsite migration. Landfill owners and operators must ensure that the concentration of methane gas does not exceed:

- 25 percent of the lower explosive limit for methane in facilities' structures, and
- The lower explosive limit for methane at the facility boundary.

Permitted limits on methane levels reflect the fact that methane is explosive within the range of 5 to 15 percent concentration in air. If methane emissions exceed permitted limits, corrective action (i.e., installation of a LFG collection system) must be taken. Subtitle D may provide an impetus for some landfills to install energy recovery projects in cases where a gas collection system is required for compliance. See 40 CFR Part 258 for more information.



## 1.3 National Pollutant Discharge Elimination System (NPDES) Permit

- Importance** LFG projects may need to obtain NPDES permits for discharging wastewater that is generated during the energy recovery process.
- Applicability** LFG condensate forms when water and other vapors condense out of the gas stream due to temperature and pressure changes within the collection system. This wastewater must be removed from the collection system. LFG projects may also generate wastewater from system maintenance and cooling tower blowdown.
- Description** NPDES permits regulate discharges of pollutants to surface waters. The authority to issue these permits is delegated to state governments by EPA. The permits, which typically last five years, limit the quantity and concentration of pollutants that may be discharged. To ensure compliance with the limits, permits require wastewater treatment or impose other operation conditions. The state water offices or EPA regional office can provide further information on these permits.

The permits are required for three categories of sources and can be issued as individual or general permits. LFG projects would be included in the “wastewater discharges to surface water from industrial facilities” category and would require an individual permit. An individual permit application for wastewater discharges typically requires this information.

- Water supply volumes
- Water utilization
- Wastewater flow
- Characteristics and disposal methods
- Planned improvements
- Storm water treatment
- Plant operation
- Materials and chemicals used
- Production
- Other relevant information

## 1.4 Clean Water Act, Section 401

- Importance** LFG projects may need CWA Section 401 certification for constructing pipelines that cross streams or wetlands.
- Applicability** LFG recovery collection pipes or distribution pipes from the landfill to a nearby gas user may cross streams or wetlands. If the construction or operation of such pipes causes any discharge of dredge into streams or wetlands, it may require Section 401 certification.
- Description** Any construction or operation of facilities that results in any discharge into streams or wetlands, is regulated under Section 401. This requirement may affect the construction of LFG project facilities or pipelines to transport LFG.

The applicant must obtain a water quality certification from the State in which the discharge will originate. The certification should then be sent to the U.S. Army Corps of Engineers. The certification indicates that such discharge will comply with the applicable provisions of Sections 301, 302, 303, 306 and 307 of the Clean Water Act (CWA).

## 1.5 Other Federal Permit Programs

The following are brief descriptions of how other federal permits could apply to LFG project development.

- RCRA Subtitle C could apply to a LFG project if it produces hazardous waste. While some LFG projects can return condensate to the landfill, many dispose of it through the public sewage system after some

form of on-site treatment. In some cases, the condensate may contain high enough concentrations of heavy metals and organic chemicals for it to be classified as a hazardous waste, thus triggering federal regulation.

- The Historic Preservation Act of 1966 or the Endangered Species Act could apply if power lines or gas pipelines associated with a project infringe upon an historic site or an area that provides habitat for endangered species.

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## **2. State Regulations and Permits**

This section provides information on permits required by the State of North Carolina for the development of a LFG project.

For an overview of the primary state-required permits, see Tables 2.1 through 2.3. The criteria and general checklists for LFG collection and LFG systems are provided in Tables 2.2 and 2.3. Please note that these checklists are for general guidance only. The summary for Air Quality is geared toward implementing controls of non-methane organic compounds (NMOC) for large landfills (regulated under the Clean Air Act). Developers of gas projects at smaller landfills should contact the Division of Air Quality for requirements that may apply to their projects. In all cases, the project developer should contact the permitting agency for further information and requirements.

### **Summary of Permits**

The two principal permits required for LFG projects in North Carolina are related to air quality and solid waste. These are regulated by the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management and Division of Air Quality. Other permits may be necessary and must be acquired from the Division of Land Quality, which is also a part of NCDENR.

**Table 2.1**

**Summary Table of State Regulations/Permits**

Standard	Permit	Agency/Contact
Landfills	Solid Waste Permit	Division of Waste Management-Solid Waste Section (see p. x)
Air	Construction & Operating Permit	Division of Air Quality (see p. x)

**Table 2.2**

**Solid Waste Permits Summary and Checklist**

- ☐ Active gas collection systems may be required to comply with 15A NCAC 13B.1626(4) to control methane gas releases.
- ☐ Submit a conceptual plan for placement of gas wells, blowers, collection lines, blowers, flares, other control devices and related infrastructure.
- ☐ The conceptual plans should include: the proposed well design, wellhead design, collection lines, valve and control types and locations, condensate devices, cap penetration details, construction quality assurance (CQA) protocols and testing, maintenance and repair procedures, closure of the system (including decommissioning of wells), and any other related engineering details. A professional engineer (PE) must seal plans and submissions.
- ☐ Following installation, provide as-built drawings and CQA certification, which must be sealed by a PE.
- ☐ Include other pertinent landfill features that may affect operations at the landfill (or maintenance if the landfill is closed).
- ☐ Provide a plan for collection, control and disposal of gas condensate. Condensate may be discharged into the leachate collection lagoons or storage tanks at lined facilities. Condensate may be included in a leachate recirculation system ONLY at lined landfills.
- ☐ Modify the landfill operation plan to include a detailed emergency response plan for landfill fire. The plan should include provision to train landfill employees in the proper response to a fire with specific steps taken concerning the gas collection system.
- ☐ Modify the landfill operations plan to coordinate the presence and operation of the gas system with other landfill operations.
- ☐ Describe routine maintenance requirements for the gas collection system.
- ☐ Modify the closure plan to incorporate the landfill gas collection system.
- ☐ Revise the closure and post-closure cost estimates and related financial assurance requirements.

- ☐ Municipal Solid Waste (MSW) landfills having a design capacity of less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume must submit an initial design capacity.
  - ☐ These same landfills are also required to submit initial and annual NMOC emission reports.
  - ☐ MSW landfills, regardless of size or volume, must submit initial design capacity and initial NMOC reports.
  - ☐ MSW landfills having a design capacity equal to or greater than 2.5 million Mg and 2.5 million cubic meters must submit initial design capacity report, initial NMOC report, and subsequent annual NMOC reports.
  - ☐ Annual NMOC emission rate reports that indicate emissions greater than 50 megagrams per year will require submission of a landfill gas collection and control system (GCCS) design plan certified by a PE.
  - ☐ Install and operate a GCCS for control of NMOC.
  - ☐ Design the GCCS for the maximum expected LFG flow rate and operate the system for at least 15 years. Collect LFG from each landfill in which initial solid waste has been placed for a period of five years if active or two or more years if closed.
  - ☐ Operate the collection system with negative pressure at each wellhead except for fire or increased well temperatures, use of a geomembrane or synthetic cover, and a decommissioned well.
  - ☐ Operate the collection system so that the methane concentration is less than 500 ppmv above the background at the surface of the landfill.
  - ☐ Develop a surface methane emission monitoring plan.
  - ☐ Operate the collection so that all collected LFG is routed to the control system.
  - ☐ Operate the control or treatment system at all times when the collected LFG is routed to the system.
  - ☐ Install sampling port and thermometer or similar measuring device at each wellhead of the active collection system.
  - ☐ Measure gauge pressure on each gas header on a monthly basis.
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### 3. Overview of Local Regulations and Permits

Within the framework of federal and state regulation, local governments will have some jurisdiction over LFG development in nearly all cases. Typically, local permits address issues that affect the surrounding community. These permits generally fall under the categories of construction, environment and health, land use and water quality/use. In addition to issuing their own permits, local governments are also responsible for administering some permits for federal and state regulations. For example, many local governments are responsible for ensuring compliance with federal air quality regulations. It should be noted, however, that some local standards and regulations are more strict than state or federal regulations.

#### ***Steps to Successful Local Permits Approval:***

The following 7 steps will help LFG project developers successfully obtain local permits approval.

- Step 1.** Determine which local authorities have jurisdiction over the project site.
- Step 2.** If necessary, determine route for LFG pipes and contact easement officials to get easements/right of ways.
- Step 3.** Contact local, city and/or county planning and public works departments to obtain information about applicable permits and to discuss your plans. Meeting with agency staff to discuss the LFG project and required permits often helps to expedite the permitting process.
- Step 4.** Obtain essential information regarding each permit, including:
  - What information is required,
  - The permitting process that should be followed, and
  - Time frames (including submittal, hearing, and decision dates).
- Step 5.** Obtain copies of the regulations to compare and verify what is required in the permit applications. If they differ, contact the appropriate permitting agency.
- Step 6.** Submit a complete application. Incomplete applications typically result in processing delays.
- Step 7.** Attend meetings or hearing(s) where the application will be discussed to respond to any questions that are raised. Failure to do so could result in delays.

#### ***Typical Local Permits***

Table 3.1 lists typical local permits and approvals required for LFG projects.

**Table 3.1****Local Regulations and Permits**

Permit	Description
<b>Building Permit</b>	Most county/local governments require building permits for construction which require compliance with several types of building codes, such as plumbing and electrical. A typical building permit application may require detailed final plans for structures (including electrical and plumbing plans), floor layout, sewage facilities, storm water drainage plan, size and shape of lot and buildings. The setback of buildings from property lines and drain field, access, size and shape of foundation walls, air vents and window access are also required, as are heating or cooling plants (where included in the design).
<b>Zoning/Land Use</b>	Most communities have a zoning and land use plan that identifies where different types of development are allowed (i.e., residential, commercial and industrial). The local zoning board determines whether a particular project meets local land use criteria and can grant variances if conditions warrant. A landfill gas project may require an industrial zoning classification.
<b>Storm Water Management</b>	Some local public works departments require a permit for discharges during construction and operation of a LFG project. Good facility design that maintains the pre-development runoff characteristics of the site will typically enable the project to meet permitting requirements easily.
<b>Solid Waste Disposal</b>	A LFG project may generate solid wastes, such as packaging material, cleaning solvents and equipment fluids. If the landfill is closed, disposal of these solid wastes may be subject to review by a local authority. Costs of disposal should also be considered.
<b>Wastewater</b>	The primary types of wastewater likely to be generated by a LFG project include maintenance wastewater and cooling tower blowdown. The city engineer's office should be contacted to provide information about available wastewater handling capacity and any unique condensate treatment requirements or permits for landfills.
<b>Fire Hazards and Precautions</b>	The mix of gases in landfill gas has a moderate to high explosion potential; methane is explosive in concentrations of 5 to 15 percent in air. Because methane has the potential to migrate from the landfill to onsite or offsite structures, it poses a significant public safety hazard. EPA requires that methane concentrations be less than 5 percent at a landfill property line, and less than 2.5 percent of the lower explosive limit (LEL) in a facility's structures. County regulations may call for even stricter standards to be observed at the landfill.
<b>Noise</b>	Most local zoning ordinances stipulate the maximum allowable decibel levels from noise sources. These levels vary depending on the location of the site. For example, LFG recovery projects located near residential areas will likely have to comply with stricter noise level standards than projects located in non-populated areas.

## Part 2: Incentive Programs

### 1. Overview of Federal Incentive Programs

There are three federal incentive programs that may apply to LFG projects: the Section 29 Tax Credit, the Renewable Energy Production Incentive (REPI), and the Qualifying Facilities (QF) Certification. Each program is described below.

#### 1.1 Renewable Energy Production Incentive (REPI)

The Renewable Energy Production Incentive (REPI), mandated under the Energy Policy Act of 1992, may provide a cash subsidy of up to 1.5 cents per kilowatt hour to owners and operators of qualified renewable energy sources, such as landfills, that began operation between October 1993 and September 2003.<sup>3</sup> Private sector entities may qualify to earn tax incentives based on a tier system. Tier 1 facilities (solar, wind, geothermal or closed loop biomass) receive full payments or pro rata payments if funds are too minimal to match all requests. Any remaining funds fall to Tier 2, which includes landfill gas facilities. If there are insufficient funds to cover Tier 2 applicants, a pro-rata system is implemented. The Department of Energy (DOE) will make incentive payments for 10 fiscal years. This period begins with the fiscal year in which application for payment for electricity generated by the facility is first made and the facility is determined by DOE to be eligible for receipt of an incentive payment. The period for payment under this program ends in fiscal year 2013. REPI payments are subject to adjustment because they are appropriated by Congress each year.

For further information, contact:

U.S. Department of Energy  
National Renewable Energy Laboratory  
Golden Field Office  
Golden, Colorado 80403  
Tel: (303) 275-4795

U.S. Department of Energy  
Efficiency and Renewable Energy  
Forrestal Building, Mail Station EE-10  
1000 Independence Avenue, S.W.  
Washington, DC 20585  
Tel: (202) 586-2206

#### 1.2 Qualifying Facilities Certification

LFG projects that generate electricity will benefit from Qualifying Facilities (QF) certification, which is granted through the Federal Energy Regulatory Commission (FERC). The following describes the benefits of QF status and the steps for applying for such status.

The Public Utility Regulatory Policies Act (PURPA)—one of five parts of the National Energy Act of 1978—was designed to promote conservation of energy and energy security by removing barriers to the development of cogeneration facilities and facilities that employ waste or renewable fuels. Such facilities are called Qualifying Facilities, or QFs. Under PURPA, utilities are required to purchase electricity from QFs at each utility's avoided cost of generating power. PURPA provides that a small power production facility, such as a LFG project that meets FERC standards, can become a QF.

In order to apply for QF status, applicants must prepare either (1) a Notice of Self-Certification, which asserts compliance with the FERC's technical and ownership criteria, or (2) an Application for Commission Certification of Qualifying Status, which requires a draft Federal Register notice and which provides actual FERC approval of

<sup>3</sup> Final Rule Making, 10 Federal Register Part 451, July 19, 1995, Vol. 60, No. 138.

QF status. In either case, the applicant must also file Form 565, which is a list of questions about the project, and must pay any filing fees associated with certifications, exemptions, and other activities. FERC will provide the QF “Info Packet” that describes the necessary steps, requirements, and background information. After submitting the initial application, further justifications and submittal of information may be required.

For the QF Info Packet and applications, contact:

Federal Energy Regulatory Commission  
Qualifying Facilities Division  
825 North Capitol Street, N.E.  
Washington, DC 20426  
Tel: (202) 208-0577  
<http://www.ferc.fed.us>

## **1.3 Section 29 Tax Credit**

Developers of LFG projects who sell LFG to an unrelated third party may qualify for a tax credit under Section 29 of the Internal Revenue Service (IRS) tax code. In order to take advantage of the credits, project developers may bring in an outside party when developing power projects. The Section 29 tax credit was established in 1979 to encourage development of unconventional gas resources, such as landfill gas. Section 29 tax credits are available through 2007 to LFG projects that had a gas sales agreement in place by December 31, 1996 and are placed in service (had an operational well field and flare in place) by June 30, 1998. The credit has been extended several times by the U.S. Congress, but currently it is discontinued.

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## **2. State Incentive Programs**

The State of North Carolina does not currently provide tax incentives for LFG projects. However, as a State Ally in the Landfill Methane Outreach Program, the Department of Environment and Natural Resources will continue to evaluate the creation of incentives within North Carolina for this purpose.

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## **3. Electricity Restructuring and LFG**

### ***What Is Electricity Restructuring?***

Electricity restructuring refers to the introduction of competition into both the wholesale and retail electricity markets. Until now, electric utilities operated as monopolies authorized by federal and state regulatory agencies to be the sole provider of electric service to consumers within a specific service territory. Under restructuring, utilities will lose these monopolies, which will enable other energy providers to compete for their customers. The result may be more energy options for consumers, lower energy prices and greater use of renewable energy sources.

Efforts to restructure the electric utility industry began in 1978 with the passage of the Public Utilities Regulatory Policies Act (PURPA). The Act requires utilities to buy power from unregulated power generators in an effort to encourage the development of smaller generating facilities, new technologies and renewable energy sources. The National Energy Policy Act of 1992 (EPACT) expanded on PURPA and allowed more types of unregulated companies to generate and sell electricity, effectively creating a competitive wholesale market for electric power.

Restructuring at the retail level has been a hot issue in many states since the passage of EPACT, which delegated to states the authority to introduce competition among electric utilities within their borders. As of January 2001, 24 states have enacted some form of restructuring legislation, while the remaining 26 are considering such legislation.



## ***How Do These Changes Affect Landfill Gas Recovery?***

Many states are including renewable energy provisions in their restructuring legislation. Such provisions mandate utilities to include a certain percentage of electricity generated from renewable or “green energy” sources into their energy mixes. LFG is one such green energy source.

In March 1998, the Clinton Administration unveiled its “Comprehensive Electricity Competition Plan” to restructure the electricity industry nationwide. The proposal includes a Renewable Portfolio Standard (RPS) which guarantees that a minimum percentage of the nation’s electricity be powered by green energy. Energy service providers would be required to cover a percentage of their electricity sales with generation from non-hydroelectric renewable sources such as wind, solar, geothermal and biomass (which includes LFG).

## ***Marketing Landfill Gas Recovery as Green Power***

Green marketing programs are one of the most promising mechanisms to encourage utilities and other energy marketers to participate in LFG projects. Green marketing allows energy marketers to position renewable energy products (including LFG) as premium products. This means that they can collect a premium price from their customers. Green marketing also allows energy marketers in competitive marketplaces to differentiate their energy product, and allows utilities in non-restructured marketplaces to gain critical product marketing experience. However, the general public is less familiar with LFG than other sources of renewable energy. Support from the LMOP is often critical to insure the success of early LFG green marketing efforts.

## ***Get the Latest Information on Electricity Restructuring in Your State***

For up-to-date information on electricity restructuring in North Carolina, visit the National Conference of State Legislatures Web site at: <http://www.ncsl.org/programs/esnr/restru.htm>. This site contains a glossary of terms related to restructuring, as well as links to the full text of restructuring legislation passed by states.

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## **4. Voluntary Reporting of Greenhouse Gases Program**

The Voluntary Reporting of Greenhouse Gases Program, created by Congress under Section 1605(b) of the Energy Policy Act of 1992, provides an opportunity for any company, organization, or individual to establish a public record of their greenhouse gas emissions, reductions, or sequestration achievements in a national database. The data submitted to the program is made publicly available via CD-ROM and the Internet. Those who report to 1605(b) can gain recognition for environmental stewardship, demonstrate support for voluntary approaches to achieving environmental policy goals, support information exchange, and inform the public debate about greenhouse gas emissions.

Additional information about the program, as well as reporting forms and technical assistance, are available through Energy Information Administration’s (EIA’s) Communications Center (202-586-0688, toll free at 800-803-5182, or via e-mail at [infohgh@eia.doe.gov](mailto:infohgh@eia.doe.gov)) and on the program’s Web site at <http://www.eia.doe.gov/oiaf/1605/frntvrgg.html>.